



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,582	12/06/2003	Benjamin Jian	AFC-002/RE	2222
27652 7590 03/28/2007 JOSHUA D. ISENBERG JDI PATENT 809 CORPORATE WAY FREMONT, CA 94539			EXAMINER PAK, SUNG H	
			ART UNIT	PAPER NUMBER
			2874	
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		03/28/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/729,582

Applicant(s)

JIAN, BENJAMIN

Examiner

Sung H. Pak

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10/03/06, 09/27/06.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36, 39 and 41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-36, 39 and 41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 9/27/2006.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's response filed 10/03/2006 has been entered. All pending claims have been carefully reviewed and reconsidered in view of the amendment.

Information Disclosure Statement

Information disclosure statement filed 9/27/2006 has been considered.

Reissue Applications

The reissue oath/declaration filed with this application is defective because it fails to identify at least one error which is relied upon to support the reissue application. See 37 CFR 1.175(a)(1) and MPEP § 1414. Specifically, the declaration fails to properly identify a specific error sufficient to support reissue of the patent. That is, the declaration must identify the specific original patent claims that include the specified limitation to be narrowed by the reissue application. See MPEP 1414(II)(B) and (C).

Claims 1-36, 39, 41 are rejected as being based upon a defective reissue declaration under 35 U.S.C. 251 as set forth above. See 37 CFR 1.175.

The nature of the defect(s) in the declaration is set forth in the discussion above in this Office action.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 7-9, and 30-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuda (US 5,434,939).

Matsuda discloses an optical device with all limitations set forth in the claims, including: a first layer (203) having a socket (216) extending through the first layer and one or more fiber socket sized to receive and align an optical fiber (Fig. 2); wherein one or more fiber socket include two or more sockets (Fig. 3c); wherein a second layer is affixed to the first layer (Fig. 2); said optical fiber having an end section that extends through the fiber socket (Fig. 2); said optical fiber terminating at the end face situated approximately adjacent to the second layer (Fig. 2); said fiber socket aligning and positioning said optical fiber therein (Fig. 2); and a VCSEL device (204, 205, Fig. 2) integrated into said second layer.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-6, 10-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Konishi et al (JP 06-138341).

Regarding claim 1, Konishi discloses an optical coupler comprising: a first layer (5, silicon guide plate), said first layer defining a fiber socket (16); said fiber socket sized to receive and align said optical fiber therein (see [0014]); a second layer (11, transparent substrate) bonded to said first layer (see [0015]); said optical fiber having an end section that extends through the fiber socket, said optical fiber terminating at an end face situated approximately adjacent to the second layer and said fiber socket aligning and positioning said optical fiber therein (Fig. 1). Konishi also discloses that the second layer is transparent substrate.

However, Konishi does not specifically teach that the second layer has the refractive index that is substantially equal to the refraction index of the optical core. When coupling optical beam between an optical fiber and optical element, using a material having refractive index that is substantially equal to the refractive index of the optical core would provide the efficient optical coupling without spreading light beam between the optical fiber and the optical element.

Thus, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the second layer with the refractive index that is substantially equal to the optical fiber core in Konishi et al in order to improve the optical coupling efficiency.

Regarding claim 2, Konishi does not explicitly state that the optical fiber is a single mode fiber. Using a single mode optical fiber is well known in the art. Since Konishi teaches making the socket almost equal to the outer diameter of the optical fiber and not specify the types of optical fibers, using any type of optical fiber including a single mode optical fiber would have been obvious to one having ordinary skill in the art.

Regarding claim 3, Konishi discloses that the first layer is a single-crystal silicon layer (see [0009]). Regarding claims 4 and 5, Konishi does not teach that the second layer comprises silicon or glass. It would have been obvious to one having ordinary skill in the art at the time the invention was made to use either a silicon or glass for the second layer in Konishi et al, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice.

Regarding claim 6, Konishi et al teach fitting and adhering the optical fiber in the socket formed in the first layer and pasting the first layer to the second layer. This arrangement provides an epoxy between the optical fiber (first layer) and the second layer. Using the epoxy having an index of refraction that matches the index of the optical fiber in Konishi et al would have been obvious to one having ordinary skill in the art to provide the efficient optical coupling.

Regarding claim 7, as described above Konishi et al teach all the claimed limitations including an optical device (12) integrated into the second layer. Regarding claims 10 and 11, as described above Konishi et al teach the claimed limitations including optical focusing element (12) having focal points approximately situated along the central axes of the fiber socket (see Fig. 1). However, Konishi et al do not teach that the focusing element is a gradient-index lens. A gradient-index lens is commonly used in the art to focus the light beam. Thus, using a gradient-index lens in Konishi et al would have been obvious to one having ordinary skill in the art at the time the invention was made to focus the light.

Regarding claim 12, Konishi et al do not specific teach that the optical fiber is a single mode fiber. Using a single mode optical fiber is well known in the art. Since Konishi et al teach making the socket almost equal to the outer diameter of the optical fiber and not specify the

Art Unit: 2874

types of optical fibers, using any type of optical fiber including a single mode optical fiber would have been obvious to one having ordinary skill in the art.

Regarding claim 13, Konishi et al show a diffractive lens (12, see Fig. 1). Regarding claims 14-17, as described above, Konishi et al teach all the claimed limitations except a third layer bonded to the second layer wherein the third layer comprising an optical device such as a VCSEL or focusing element. Since Konishi et al teaches further coupling of a semiconductor laser (1) and a focusing element (2), using additional layer to accommodate optical device such as VCSEL or lenses in Konishi et al would have been obvious to one having ordinary skill in the art at the time the invention was made to make the device more compact and easier to align.

Allowable Subject Matter

Claims 18-29, 34-36, 39 contain allowable subject matter.

The following is a statement of reasons for the indication of allowable subject matter:

A method of forming a multilayer optical fiber coupler is well known in the art. Such method, wherein one or more cylindrical optical fiber sockets being formed on a substrate via photolithographic technique is also known in the art (please refer to prior Office Actions). However, none of the prior art fairly teaches or suggests such method of forming a multilayer optical fiber coupler, wherein the cylindrical optical fiber socket is formed through the substrate layer via deep reactive ion etching, as claimed in the instant application. As discussed in the applicant's remarks filed 2/24/2006, deep reactive ion etching is materially different process compared to prior art reactive ion etching process. While using deep reactive ion etching to form cylindrical optical fiber socket is now known and described in numerous patent and non-patent

Art Unit: 2874

literature in the current state of the art, none of the prior art fairly teaches the limitations discussed above.

The earliest prior art that discusses the use of deep reactive ion etching for forming optical fiber alignment structure is Hurst, Jr. et al. (US Pat. 6,360,035 B1). Figure 20 of Hurst reference is reproduced below.

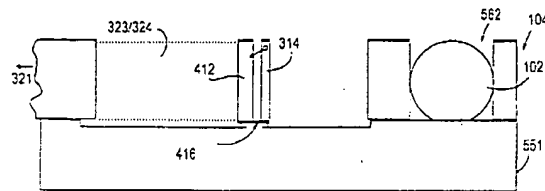


FIG. 20

In column 20 lines 9-20, Hurst explicitly teaches the use of a deep reactive ion etching for forming an alignment groove (562) precisely formed to accept an optical fiber (102) therein. However, Hurst fails to teach or suggest forming a cylindrical alignment fiber socket extending through the substrate as claimed in the instant application.

Response to Arguments

Applicant's arguments filed 9/27/2006 have been carefully reviewed by the examiner. However, applicant's arguments regarding the patentability of product claims are not convincing and the previous ground of claim rejection is maintained by the examiner.

Particularly, the examiner appreciates applicant's detailed discussion of how "deep reactive ion etching" makes it easier to produce deeper and more precise alignment holes (as discussed in pages 16-19 of applicant's response filed 9/27/2006), as compared to "reactive ion

Art Unit: 2874

etching.” However, such “deep reactive ion etching” does not produce *materially different* structure that is *patentable* over the alignment hole produced by “reactive ion etching” process. That is, while it is appreciated that “deep reactive ion etching” may be *able* to produce more precise alignment holes, the ultimate structure of the product claimed by the product claims of the instant application is not patentably distinguishable from the prior art structure.

As stated in MPEP 2113, “the lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established (emphasis added). We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith.” In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972).

As such, previous grounds of claim rejection based on 35 USC 102/103 are maintained by the examiner.

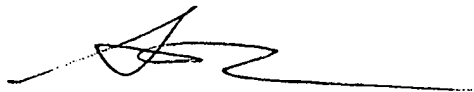
Art Unit: 2874

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571)272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



Sung H. Pak
Primary Patent Examiner
Art Unit 2874